

CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

- 1 1. A stochastic integer programming based constrained optimization method
2 for allocation of classrooms and instructors to requested classes associated
3 with cancellation probabilities comprising the steps of:
4 inputting a list of classes, their cancellation probabilities and available
5 classrooms and instructors;
6 analyzing operational revenue/profit under different planning scenarios
7 involving chaining of various classes, prerequisite relationships, and inter-
8 class spacing requirements; and
9 generating a revenue/profit optimization model of overall operational
10 revenue/profit under the different planning scenarios.

- 1 2. A stochastic integer programming based constrained optimization method
2 for allocation of classrooms and instructors to requested classes associated
3 with cancellation probabilities comprising the steps of:
4 inputting a list of classes by location city, preferred time windows,
5 their cancellation probabilities and available classrooms and instructors;
6 analyzing operational revenue/profit under different planning scenarios
7 involving chaining of various classes, prerequisite relationships, and inter-
8 class spacing requirements;
9 generating a revenue/profit optimization model of overall operational
10 revenue/profit under the different planning scenarios by location city;
11 solving a stochastic program of a revenue/profit optimization model by
12 solving its deterministic equivalent; and

13 outputting a list of classes scheduled by curriculum identification (ID),
14 corresponding start date, allocated classrooms, location city, allocated
15 instructor, and expected revenue.

1 3. The stochastic integer programming based constrained optimization method
2 recited in claim 2, wherein the list of valid start dates for each class is
3 calculated based on lengths of each class and available time windows for each
4 class.

1 4. The stochastic integer programming based constrained optimization method
2 recited in claim 3, wherein the lists of valid start dates for each back-to-back
3 class is calculated based on lengths of each class and available time windows
4 for each class.

1 5. The stochastic integer programming based constrained optimization method
2 recited in claim 2, wherein the list of valid classrooms for each class is
3 calculated based on tier codes for each class (course) and the available
4 classrooms during the allowable time windows for each class.

1 6. The stochastic integer programming based constrained optimization method
2 recited in claim 5, wherein the lists of classrooms for each back-to-back class
3 is calculated based on lengths of each class and available time windows for
4 each class.

1 7. The stochastic integer programming based constrained optimization method
2 recited in claim 2, wherein the list of valid instructors for each class is
3 calculated based on the available instructors with required skills during the
4 allowable time windows for each class.

1 8. The stochastic integer programming based constrained optimization method
2 recited in claim 7, wherein the lists of instructors for each back-to-back class
3 is calculated based on lengths of each class and available time windows for
4 each class.

1 9. The stochastic integer programming based constrained optimization method
2 recited in claim 2, further comprising the steps of:
3 inputting a list of classes by location city, preferred time windows,
4 their cancellation probabilities and available training partner (ATP);
5 generating a revenue/profit optimization model of overall operational
6 revenue/profit under the different planning scenarios for all locations and
7 training partner locations simultaneously; and
8 outputting a list of available training partner classes scheduled by
9 curriculum ID, corresponding start date, and expected revenue.

1 10. The stochastic integer programming based constrained optimization
2 method recited in claim 9, wherein the lists of valid start dates for each class is
3 calculated based on lengths of each class and available time windows for each
4 training partner (ATP) class.

1 11. The stochastic integer programming based constrained optimization
2 method recited in claim 2, further comprising the steps of:
3 generating a revenue/profit optimization model of overall operational
4 revenue/profit under the different planning scenarios for all locations
5 simultaneously; and
6 outputting a distribution of optimal class schedules and associated
7 revenue by scenario.

1 12. The stochastic integer programming based constrained optimization
2 method recited in claim 2, wherein the cancellation probability for each class
3 is calculated from historical data.

1 13. The stochastic integer programming based constrained optimization
2 method recited in claim 2, further comprising the step of inputting a list of
3 classes with pre-allocated start dates, classrooms and instructors.

1 14. A system implementing stochastic integer programming based constrained
2 optimization for allocation of classrooms and instructors to requested classes
3 associated with cancellation probabilities comprising:
4 a database of classes, instructors, classrooms and class requests;
5 a data processor accessing the database to input a list of classes, their
6 cancellation probabilities and available classrooms and instructors; and
7 a stochastic integer programming module analyzing operational
8 revenue/profit under different planning scenarios involving chaining of
9 various classes, prerequisite relationships, and inter-class spacing
10 requirements and generating a revenue/profit optimization model of overall
11 operational revenue/profit under the different planning scenarios.